

Region 8
FPM

200 Weaver Boulevard
Asheville, NC 28804

3430

Mar. 30, 1984

#84-1-6

Ralph C. Schmidt, Chief
Department of Natural Resources
P.O. Box 5887
Puerta de Tierra
San Juan, PR 00906

Dear Ralph:

In early February 1984, you requested assistance from Forest Pest Management to evaluate and determine the causal agent involving tree mortality in two plantations of Caribbean pine on the island of Puerto Rico.

You indicated the pine mortality was thought to have been caused by bark beetle activity, and this was the reason for immediate concern. You also indicated that it was important to identify the causal agent, because Caribbean pine was not native to Puerto Rico and had been planted throughout the island in provenance trials and in plantations on some private farmlands for monetary income to local farmers.

On the evening of February 12, Pat Barry arrived in San Juan, Puerto Rico and made contact with your technician, Luis Gonzales, San Juan Office of the Department of Natural Resources (DNR).

On the morning of February 13, Luis Gonzales picked Pat up at the Hotel Pierre, and they traveled to Mayaguez at the western end of the island. There they met John Perez, Forester with the Mayaguez Regional Office of DNR and his technician, Oscar Vazquez. The problem of the dead and dying trees was briefly discussed, needed equipment was gathered, and then they traveled to the first location of dead pines.

The first spot of dead pines was in a 25-year-old plantation of Caribbean pine on the farm of Tellesforo Beltran Carr, 405 Cerro Cordo, Moca, P.R. near Anasco, P.R. Thirty-seven dead and dying trees were examined for the presence of bark beetles.

An ambrosia beetle, family Scolytidae, was found throughout the spot in the lower portion of the main bole of the dead trees. The beetle has been tentatively identified as being in the genus *Xyleborus*. During the tree examinations, two trees were cut down; one was completely dead, and the other dead only in the upper one-third of the main bole. The partially dead tree had several live lower limbs. The entire main bole and limbs of each of the trees were examined for the presence of insect activity. No bark beetles or ambrosia beetles were found in the living portion of the partially dead

tree. Ambrosia beetles were found in the lower portion of the completely dead tree from the ground to about 12 feet up on the main bole. Longhorned beetle larvae, wood borers in the family Cerambycidae, were found in the older dead wood in the top of the partially dead tree and throughout the bole of the completely dead tree. Tree examinations showed that insects were not the cause of the pine mortality. Ambrosia beetles only attack dead or dying tissue of trees that have been severely stressed or killed by another causal agent. The longhorned or wood-boring beetles only attack dead trees for reproductive purposes.

Past history of the plantation was then checked and showed that it had been burned by a wildfire approximately 3 years ago, and that the farmer was currently thinning the plantation on the eastern side for fenceposts. The farmer also indicated that he had removed an occasional tree from the area where the dead pines were for fenceposts.

Another small spot of dead trees on the south side of the plantation was then examined, and the causal agent was the wildfire that occurred approximately 3 years ago. The spot had about 6 dead trees that had died periodically since the fire. One tree with red needles had died within the past 3 or 4 months. This particular tree had a fire scar that covered over half of the main bole of the tree and had some dead wood present in the center of the scar. This spot was on the edge of the plantation near an area of heavy, brushy fuel where the fire was probably very hot.

After examining the fire damage, another spot about 3 to 4 miles away in another plantation was examined. The spot contained approximately 12 to 15 trees. This spot and the spot on Mr. Carr's farm were very similar in appearance. All of the damage within the spot seemed to have occurred at approximately the same point in time. There was no progression or continuous tree dying; the trees all died at once. It was also apparent that the two spots of dead trees probably occurred within hours or at the most a couple of days apart. In each of the two larger spots of dead Caribbean pine, Pat found that another species of tree had been damaged by the causal agent. The other tree affected was the matchwood, *Yagrumo macho*, *Didymopanax morototoni*. The dead *Yagrumo* was within the interior of the dead pine spots. *Yagrumo* outside of the spots of dead pines was not affected. At this point in time, Pat felt that the causal agent was probably some environmental disturbance, such as lightning.

That afternoon, Pat called Asheville and discussed the possibility of a root rot or another disease with Steve Oak, and inquired on how to sample and examine the tree for a possible disease. After talking with Steve, the consensus was that they would return to San Juan that night and return to the farm of Mr. Carr the next day to sample for a possible disease, such as root rot.

At approximately 7:30 a.m. on February 14, Pat was picked up at the Hotel Pierre by Alberto Rodriguez, Biological Technician, USDA Forest Service, Southern Forest Experiment Station, Institute of Tropical Forestry, Rio Piedras, P.R. Pat and Alberto traveled to Mayaguez, met John Perez, and went back to the spot of dead pine on Mr. Carr's land. A complete root

system was examined for the possible presence of root rot, and no symptoms were found. The main stem was examined in 2 or 3 places near the base of the tree for abnormal stains, streaks, or resin soaking in the wood, and none were found. The only stain present was that of blue stain fungi, which was probably introduced by the ambrosia beetle or the longhorned wood borer.

Another possibility was thought of after Pat had returned to Asheville on the 15th of February, and that was the possibility of pine wood nematodes. Pat obtained samples from the most recently killed tree in one of the spots, and he and Steve Oak, Plant Pathologist, Forest Pest Management, Asheville Field Office, tested the samples for nematodes. The results of the tests were negative; no nematodes were found in the sample.

Pat discussed the problem with many of his colleagues, and the consensus was that it was probably lightning or some other abnormal environmental phenomenon. One factor that lead to this diagnosis was the fact that both coniferous and deciduous trees were killed by the causal agent. Chemicals were also ruled out; there was no evidence of the use of any chemicals in the area.

The farmer, Mr. Carr, remembered a very intensive storm either the last week in November or the first week in December 1983. The farmer said that lightning did strike in the general area of the dead pines. He had indicated earlier that he felt that lightning killed the trees. He also indicated that prior to the intensive storm, the area had experienced a fairly severe drought. The drought was from late September through November. This was also confirmed by John Perez. The farmer also said that lightning was very intensive and frequent during the storm.

No control recommendations were necessary, because the insect activity in each of the spots was secondary.

Pat did recommend that Mr. Carr could salvage and make use of the dead trees, if they were still considered usable for fenceposts.

It was also recommended that a line of green trees be marked bordering the dead trees around the spot. This can be used as a reference for any continued activity, just in case the diagnosis is wrong. Pat also recommended that close surveillance be kept on the spots of dead trees so that early detection of any future activity will be possible. He also asked that he be contacted immediately if any further activity is detected. Early detection and early examination of any pest problem is essential in determining the causal agent involved and an early corrective solution to the problem.

The diagnosis of the problem and the recommendations were discussed with Ralph Schmidt on the afternoon of February 14, 1984 at the site of the dead trees on Mr. Carr's farm.

Ralph C. Schmidt, Chief

On February 15, the diagnosis and recommendations were discussed with Leon Liegel, Soil Scientist, USDA Forest Service, Southern Forest Experiment Station, Institute of Tropical Forestry. Soil samples were also taken for analysis by Leon's technician, Alberto Rodriguez. The results of the soil samples were not available at the time this report was written.

Sincerely,

HAROLD W. FLAKE
Field Representative

cc: Toko
Dan Sims
Leon Liegel
Alex
Doraville
Mag
Barry

PJBarry/drt/3/30/84